REMARKS

This is intended as a full and complete response to the Office Action dated May 12, 2006, having a shortened statutory period for response set to expire on August 12, 2006. Please reconsider the claims pending in the application for at least the reasons discussed below.

Claims 11-13, 15-18, and 21-28 remain pending in the application and are shown above. Claims 11-13, 15-18, 21, and 23-28 are rejected. Claim 22 is objected to. Reconsideration of the rejected claims is requested for reasons presented below.

Claims 11-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Chiang, et al.* (U.S. Patent No. 5,817,572) in view of *Sugahara, et al.* (U.S. Patent No. 5,989,998). The Examiner states that *Chiang, et al.* teaches a method of forming interconnect structures including providing a substrate (320) having a contact (321) formed therein, depositing a first dielectric layer (322) on said substrate, forming an etch stop layer (323) on said first dielectric layer (322), forming a second dielectric layer (350) on said etch stop layer (323), forming a photoresist layer (352) on said second dielectric layer (350), and using said photoresist layer to form a contact hole (351) in said second dielectric layer (350), wherein said first dielectric layer (322) and said second dielectric layer (350) may include any suitable dielectric material or materials including silicon dioxide, silicon nitride, silicon oxynitride, phosphosilicate glass, borophosphosilicate glass, fluoropolymer, parylene, polyimide, any suitable spin-on glass, or any suitable spin-on polymer, and further forming a third dielectric layer (395) over said second dielectric layer (column 13, line 27-column 16, line 9). The Examiner acknowledges that *Chiang, et al.* fails to teach using a low dielectric constant material that is an oxidized organosilane layer. The Examiner notes that *Sugahara, et al.* teaches a method of depositing on a substrate a plurality of layers, wherein one or more of the layers is a low dielectric constant oxidized organosilane layer comprising carbon, and asserts that it would have been obvious to combine the teachings of *Chiang, et al.* and *Sugahara, et al.* to enable forming the spin on glass layer in *Chiang, et al.* as taught by *Sugahara, et al.* for the advantage of forming a film with improved film formability and cost efficiency (*Sugahara, et al.*, column 3, lines 25-30). Applicants respectfully traverse the rejection.

Applicants respectfully submit that combining *Chiang, et al.* and *Sugahara, et al.* to replace the spin on glass layer in the lists of dielectric materials for layers 322 and 350 in *Chiang, et al.* with the oxidized organosilane layer of *Sugahara, et al.* does not provide or suggest all of the elements of claim 11, as claim 11 recites a method that includes depositing a plurality of layers including both a parylene, FSG, or silicon oxide layer and an oxidized organosilane layer. While *Chiang, et al.* provides extensive lists of materials for dielectric layers 322 and 350, *Chiang, et al.* does not teach or suggest using a parylene, FSG, or silicon oxide layer for one of the dielectric layers and a different layer, such as an organic spin on glass layer or an oxidized organosilane layer, for the other dielectric layer. The only specific combination of dielectric layers 322 and 350 that *Chiang, et al.* teaches includes the same material, silicon oxide, for both layers (column 21, lines 24-26). *Sugahara, et al.* describes depositing a plurality of layers including two oxidized organosilane dielectric layers (Figure 3A, 202, 204, column 8, lines 59-63). Thus, Applicants submit that, at best, the combination of *Chiang, et al.* and *Sugahara, et al.* suggests depositing a plurality of layers comprising two oxidized organosilane layers rather than a plurality of layers comprising a parylene, FSG, or silicon oxide layer in addition to an oxidized organosilane layer.

Thus, Applicants respectfully submit that *Chiang, et al.* in view of *Sugahara, et al.* does not teach, show, or suggest a method comprising depositing on a substrate a plurality of layers, wherein the plurality of layers comprises one low dielectric constant oxidized organosilane layer comprising carbon, wherein the low dielectric constant oxidized organosilane layer is deposited in a plasma enhanced process from a mixture comprising an organosilane compound and an oxidizing gas and the carbon content of the low dielectric constant oxidized organosilane layer is from 1% to 50% by atomic weight, a layer selected from the group consisting of parylene, FSG, and silicon oxide layers, and a top layer of the plurality of layers that is a photoresist, as recited in claim 11. Applicants respectfully request withdrawal of the rejection of claim 11 and of claims 12-13, which depend thereon.

Claims 15-18, 21, and 23-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Chiang, et al.* in view of *Matsuura* (U.S. Patent No. 6,124,641) and

Shu, et al. (U.S. Patent No. 6,348,421). The Examiner asserts that it would have been obvious to combine the teachings of *Chiang, et al.* and *Matsuura* to enable using the dielectric layer of *Matsuura* in *Chiang, et al.* for the advantage of preventing forming a poisoned via in a resulting insulating film (*Matsuura*, column 2, lines 57-64). The Examiner further asserts that it would have been obvious to combine the teachings of *Chiang, et al.* and *Matsuura* with *Shu, et al.* to enable forming the oxide layer in *Chiang, et al.* and *Matsuura* according to the teachings of *Shu, et al.* since *Shu, et al.* provides a conventional method of forming oxide layers (column 1, line 31-column 2, line 17). Applicants respectfully traverse the rejection.

Chiang, et al. is discussed above. *Matsuura* describes depositing insulating films that include Si-H, Si-O, and Si-C bonds by chemical vapor deposition using methyl silane and hydrogen peroxide (abstract, column 5, lines 24-25). *Matsuura* indicates that the presence of the Si-H bonds distinguishes the films described therein from conventional SOG films (column 5, lines 23-24), and that the presence of the Si-H bonds is desirable because they reduce the density and dielectric constant of the films (column 5, lines 27-35) and replace some of the $Si-CH_3$ bonds that can contribute to poisoned vias in conventional SOG films (column 5, lines 58-61). Applicants submit that there is no motivation or suggestion in *Matsuura* to use a plasma enhanced deposition process to form the insulating films described therein.

Shu, et al. states that carbon-doped SiO_2 layers have been deposited by plasma enhanced CVD and notes that such layers include voids (column 2, lines 18-22). *Shu, et al.* does not discuss the types of bonds that are present in the carbon-doped SiO_2 layers deposited by plasma enhanced CVD or suggest that the carbon-doped SiO_2 layers described therein include Si-H bonds, which are part of *Matsuura's* desired film. Applicants respectfully submit that there is no motivation or suggestion in *Chiang, et al.*, *Matsuura*, and *Shu, et al.*, individually, or in combination, to modify *Matsuura's* method of depositing an oxidized organosilane layer to include plasma, as described in *Shu, et al.*, for use in *Chiang, et al.'s* method of depositing layers. Applicants respectfully submit that the Examiner's assertion that it would have been obvious to combine to combine *Chiang, et al.*, *Matsuura*, and *Shu, et al.* to enable forming the oxide layer in *Chiang, et al.* and *Matsuura* according to *Shu, et al.* since

Shu, et al. provides a conventional method of forming oxide layers is not sufficient to support a finding of obviousness in the absence of a suggestion or motivation to form the dielectric layer in *Chiang, et al.* and *Matsuura* according to the plasma enhanced process of *Shu, et al.*

Thus, *Chiang, et al.* in view of *Matsuura* and *Shu, et al.* does not teach, show, or suggest a method comprising depositing on a substrate a plurality of layers, wherein one or more of the layers is a low dielectric constant oxidized organosilane layer comprising carbon, wherein the low dielectric constant oxidized organosilane layer is deposited in a plasma enhanced process from a mixture comprising a methylsilane compound and an oxidizing gas, the carbon content of the low dielectric constant oxidized organosilane layer is from 1% to 50% by atomic weight, and a top layer of the plurality of layers is a photoresist, as recited in claim 15. Applicants respectfully request withdrawal of the rejection of claim 15 and of claims 16-18, 21, and 23-28, which depend thereon.

Claim 22 is objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants submit that claim 22 is also patentable for the reasons discussed above with respect to claim 15, upon which claim 22 depends. Applicants respectfully request withdrawal of the objection to claim 22.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, Applicants believe that a detailed discussion of the secondary references is not necessary for a full and complete response to this office action.

Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

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